

Amendments to the Claims

This listing of claims will replace all prior versions and listing of claims in this application.

Listing of claims:

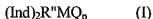
What is claimed is:

Claims 1-28 (Cancelled)

29. (Previously Presented) A process for producing a polyolefin having a multimodal molecular

weight distribution, which process comprises:

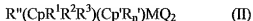
(a) polymerizing a first olefin monomer in the presence of a bis-indenyl metallocene catalyst, to form a first multimodal polyolefin component, said bis-indenyl metallocene catalyst being represented by formula (I):



wherein:

each Ind is the same or different and is a substituted or unsubstituted indenyl group, or a substituted or unsubstituted tetrahydroindenyl group; Rⁿ is a structural bridge imparting stereorigidity to the component; M is a metal atom from group IVB, VB or VIB of the periodic table; p is the valence of M minus 2; and each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen; and

(b) polymerizing a second olefin monomer in the presence of a second metallocene catalyst to form a second polyolefin component, said second metallocene catalyst being represented by formula (II):



wherein:

Cp is a substituted or unsubstituted cyclopentadienyl ring; Cp' is a substituted or unsubstituted fluorenyl group; Rⁿ is a structural bridge imparting stereorigidity to the component; R¹ is a substituent on the cyclopentadienyl ring which is distal to the bridge, which distal substituent comprises a hydrogen or a

bulky group of the formula XR^*_3 in which X is chosen from Group IVA, and each R^* is the same or different and chosen from hydrogen or hydrocarbyl of from 1-20 carbon atoms; R^2 is a substituent on the cyclopentadienyl ring which is proximal to the bridge and positioned *non-vicinal* to the distal substituent and is a hydrogen or is of the formula $\text{YR}^\#_3$ in which Y is chosen from group IVA, and each $\text{R}^\#$ is the same or different and chosen from hydrogen or hydrocarbyl of 1-7 carbon atoms, R^3 is a substituent on the cyclopentadienyl ring which is proximal to the bridge and is a hydrogen or is of the formula $\text{ZR}^\$3$, in which Z is chosen from group IVA, and each $\text{R}^\$$ is the same or different and chosen from hydrogen or hydrocarbyl of 1-7 carbon atoms; n is an integer of from 0-8; each R'_n is the same or different and is a group $\text{AR}'''3$ in which A is chosen from group IVA and each R''' is the same or different and chose from hydrogen or a hydrocarbyl having 1-20 carbon atoms; wherein X, Y, Z and A are independently selected from carbon and silicon; M is a Group IVB transition metal or vanadium; and each Q is hydrocarbyl having 1-20 carbon atoms or is a halogen; and wherein the molecular weight distribution of the first polyolefin component overlaps with the molecular weight distribution of the second polyolefin component.

30. (Previously Presented) The process of claim 29 wherein the first polyolefin component comprises a bimodal polyolefin.

31. (Previously Presented) The process of claim 30 wherein the second polyolefin component comprises a monomodal polyolefin.

32. (Previously Presented) The process of claim 29 wherein the indenyl groups of the catalyst are unsubstituted or are substituted at the at least one of the 2, 2', 4 and/or 4' positions.

33. (Previously Presented) The process of claim 32 wherein the indenyl groups are symmetrically substituted.

34. (Previously Presented) The process of claim 32 wherein the indenyl groups of the catalyst are substituted by a bulky group at at least one of the 4 and 4' positions.

35. (Previously Presented) The process of claim 34 wherein said bulky group is selected from the group consisting of a methyl group, an isopropyl group, a tertiary butyl group, a trimethylsilyl group, and a phenyl group.

36. (Previously Presented) The process of claim 35 wherein said bulky group is a phenyl group which forms a bis-indenyl group with the indenyl group to which it is attached.

37. (Previously Presented) The process of claim 34 wherein the indenyl groups are substituted at at least one of the 2 and 2' positions by a methyl group.

38. (Previously Presented) The process of claim 32 wherein the bridging group R" in the metallocene of formula (I) is a C₁-C₄ alkylene group.

39. (Previously Presented) The process of claim 38 wherein said bridging group comprises a substituted or unsubstituted ethylene group.

40. (Previously Presented) The process of claim 29 wherein in the cyclopentadienyl-fluorenyl group, R¹ is selected from the group consisting of C(CH₃)₃, C(CH₃)₂Ph, CPh₃ and Si(CH₃)₃.

41. (Previously Presented) The process of claim 40 wherein R² is CH₃.

42. (Previously Presented) The process of claim 41 wherein R² is CH₃.

43. (Previously Presented) The process of claim 29 wherein n is 2.

44. (Previously Presented) The process of claim 43 wherein the fluorenyl group is substituted at the 3 position and the 6 position.

45. (Previously Presented) The process of claim 44 wherein each R' is selected from the group consisting of C(CH₃)₃ and Si(CH₃)₃.

46. (Previously Presented) The process of claim 45 wherein the R' groups are the same.

47. (Previously Presented) The process of claim 40 wherein R" in formula (II) is selected from alkylidene having 1-20 carbon atoms, a dialkyl germanium, silicon or siloxane, an alkyl phosphine and an amine.

48. (Previously Presented) The process of claim 47 wherein R" in formula (II) is isopropylidene or dimethylsilanediy.

49. (Previously Presented) The process of claim 44 wherein the fluorenyl ring is unsubstituted at both positions 4 and 5.

50. (Previously Presented) The process of claim 29 wherein M is zirconium or titanium.

51. (Previously Presented) The process of claim 50 wherein Q is a halogen.

52. (Previously Presented) The process of claim 29 wherein the steps (a) and (b) are carried out in the same reaction zone.

53. (Previously Presented) The process of claim 1 wherein the polymerization of paragraphs (a) and (b) are carried out in at least two series-connected reaction zones.

54. (Withdrawn) A multisite catalyst system for producing a polyolefin having a multimodal molecular weight distribution, which catalyst system comprises two or more catalyst components immobilized on a support, wherein the catalyst components comprise:

(a) a first catalyst component comprising a bis-indenyl metallocene catalyst, to form a first multimodal polyolefin component represented by formula (I):



wherein:

each Ind is the same or different and is a substituted or unsubstituted indenyl group, or a substituted or unsubstituted tetrahydroindenyl group; R^n is a structural bridge imparting stereorigidity to the component; M is a metal atom from group IVB, VB or VIB of the periodic table; p is the valence of M minus 2; and each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen; and

(b) a second catalyst component represented by formula (II):



wherein:

Cp is a substituted or unsubstituted cyclopentadienyl ring; Cp' is a substituted or unsubstituted fluorenyl group; R^n is a structural bridge imparting stereorigidity to the component; R^1 is a substituent on the cyclopentadienyl ring which is distal to the bridge, which distal substituent comprises a hydrogen or a bulky group of the formula XR^*R_3 in which X is chosen from Group IVA, and each R^* is the same or different and chosen from hydrogen or hydrocarbyl of from 1-20 carbon atoms; R^2 is a substituent on the cyclopentadienyl ring which is proximal to the bridge and positioned *non-vicinal* to the distal substituent and is a hydrogen or is of the formula $\text{YR}^{\#}\text{R}_3$ in which Y is chosen from group IVA, and each $\text{R}^{\#}$ is the same or different and chosen from hydrogen or hydrocarbyl of 1-7 carbon atoms, R^3 is a

substituent on the cyclopentadienyl ring which is proximal to the bridge and is a hydrogen or is of the formula ZR_n , in which Z is chosen from group IVA, and each R_n is the same or different and chosen from hydrogen or hydrocarbyl of 1-7 carbon atoms; n is an integer of from 0-8; each R'_n is the same or different and is a group AR''' in which A is chosen from group IVA and each R''' is the same or different and chose from hydrogen or a hydrocarbyl having 1-20 carbon atoms; wherein X, Y, Z and A are independently selected from carbon and silicon; M is a Group IVB transition metal or vanadium; and each Q is hydrocarbyl having 1-20 carbon atoms or is a halogen.